STATE OF CALIFORNIA

GRANTS/CONTINGENT AWARD REQUEST

CEC-270 (Revised 02/10) CALIFORNIA ENERGY COMMISSION

To: Grants and Loans Office Date: 6/1/2011

Project Manager: Avtar Bining Phone Number: 916-327-1411

Office: Energy Systems Research Office Division: Energy Research and Development MS- 43

Project Title: Solid State Batteries for Grid-Scale Energy Storage

Type of Request: *(check one)*

☒ **New Agreement:** *(include items A-F from below)* Agreement Number: PIR-11-001

Program: PIER E / Energy Technology Systems Integration

Solicitation Name and/or Number: PON-09-801-04 (American Recovery and Reinvestment Act of 2009 Cost Share for Selected FOAs)

Legal Name of Recipient: Seeo Inc.

Recipient's Full Mailing Address: 3906 Trust Way
Hayward, CA 94545-3716

Recipient's Project Officer: Mohit Singh Phone Number: 510-848-7336

Agreement Start Date: 11/21/2011 Agreement End Date: 9/25/2014

☐ **Amendment :** *(Check all that apply)* Agreement Number:

- ☐ Term Extension – New End Date:
- ☐ Work Statement Revision *(include Item A from below)*
- ☐ Budget Revision *(include Item B from below)*
- ☐ Change of Scope *(include Items A – F as applicable from below)*
- ☐ Other:

ITEMS TO ATTACH WITH REQUEST:

A. Work Statement
B. Budget
C. Recipient Resolution, if applicable. (Resolution may be requested in Special Conditions if not currently available.)
D. Special Conditions, if applicable.
E. CEQA Compliance Form
F. Other Documents as applicable
- Copy of Score Sheets
- Copy of Pre-Award Correspondence
- Copy of All Other Relevant Documents

California Environmental Quality Act (CEQA)

☐ CEC finds, based on recipient's documentation in compliance with CEQA:
- ☐ Project exempt: NOE filed:
- ☐ Environmental Document prepared: NOD filed:
- ☐ Other:

☒ CEC has made CEQA finding described in CEC-280, attached

Funding Information:

*Source #1:	PIER-E	Amount:	$ 600,000.00	Statute:	10-	FY: 11-12	Budget List #: 501.027I
*Source #2:		Amount:	$	Statute:		FY:	Budget List #:
*Source #3:		Amount:	$	Statute:		FY:	Budget List #:

If federally funded, specify federal agreement number:

*** Source Examples include ERPA, PIER-E, PIER-NG, FED, GRDA, ARFVT, OTHER.**

Business Meeting Approval: *(refer to Business Meeting Schedule)*

Proposed Business Meeting Date: 10/5/2011 ☐ Consent ☒ Discussion

Business Meeting Participant: Avtar Bining Time Needed: 5 minutes

Agenda Notice Statement: *(state purpose in layperson terms)*

Possible approval of a ☒ Grant / ☐ Contingent Award to…

Possible approval of Agreement PIR-11-001 for a grant of $600,000 to Seeo, Inc. to develop and test a 25kWh prototype battery system based on nanostructured polymer electrolytes and validate its performance advantages for use in grid-tied energy storage and community energy storage applications. This award will be cost-share for the recipient's American Recovery and Reinvestment Act of 2009 award. (PIER Electric Funding.) Contact: Avtar Bining (5 minutes)

Project Manager	Date	Office Manager	Date	Deputy Director	Date

Notice of Exemption **Form D**

To: Office of Planning and Research
PO Box 3044, 1400 Tenth Street, Room 222
Sacramento, CA 95812-3044

From: California Energy Commission
1516 Ninth Street, MS-48
Sacramento, CA 95814

Project Title: Solid State Batteries for Grid-Scale Energy Storage

Project Location – Specific: 626 Bancroft Way
Project Location – City: Berkeley, CA **Project Location – County:** Alameda

Description of Project:

The project will deliver the first large-scale or grid-scale prototype of a new class of advanced lithium ion rechargeable batteries, with unprecedented safety, lifetime, energy density, and cost. The primary focus of this project will be the development and deployment of a 25kWh prototype battery system based on Seeo's proprietary nanostructured polymer electrolytes. This development effort, which without Energy Commission funding Seeo would be unable to pursue, will allow the company to validate the transformational performance advantages of its technology for use in grid-tied energy storage applications. In particular, Seeo seeks to address the utility market needs for CES systems, which envision small (<100kW) distributed energy storage systems alongside pad-mounted and pole-mounted transformers, and grid-connected electric vehicle systems.

Name of Public Agency Approving Project: California Energy Commission

Name of Person or Agency Carrying Out Project: Seeo Inc.

Exempt Status: (*check one)*

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☐ Categorical Exemption. State type and section number _____
- ☐ Statutory Exemptions. State code number. _____
- ☒ Common Sense Exemption. 15061(b)(3)

Reasons why project is exempt:

The project does not have the potential to cause a significant environmental impact because it involves the development of a prototype battery system.

Lead Agency
Contact Person: **Avtar Bining** **Area code/Telephone/Ext:** 916-327-1411

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: _____ **Date:** _____ **Title:** _____

☒ **Signed by Lead Agency**

☐ **Signed by Applicant** **Date received for filing at OPR:** _____

Proposed Agreement between California Energy Commission and Seeo Inc.

Title: Solid State Batteries for Grid-Scale Energy Storage
Amount: $600,000.00
Term: 50 months
Contact: Avtar Bining
Committee Meeting: 9/1/2010

Funding

FY	Program	Area	Initiative	Budget	This Project	Remaining Balance	
10	Electric	ETSI	ARRA	$9,623,697	$600,000	$0	0%

Recommendation

Possible approval of this agreement with Seeo, Inc. (Seeo) for 50 months, $600,000.00 cost share grant to supplement the contractor's American Recovery and Reinvestment Act of 2009 (ARRA) award. Under the U.S. Department of Energy (DOE) - National Energy Technology Laboratory (NETL) Smart Grid Demonstrations - Area of Interest 2.5 - ARRA Grant Funds DE-FOA-0000036, Seeo, along with iCeL and University of California Berkeley (UCB) as key partners, was awarded $6,196,060 in DOE ARRA funds for this project. The project includes the development, demonstration, and deployment of a 25kWh prototype battery system based on Seeo's proprietary nanostructured polymer electrolytes. This will also allow the company to validate the transformational performance advantages of its technology for use in grid-tied energy storage and community energy storage (CES) applications. The total budget for the Seeo project is $12,392,122.

Issue

Today's lithium ion batteries have problems with safety, lifetime, energy density, and cost. Chemical degradation leads to premature failure in existing applications, and poor lifetimes prevent lithium ion cells from addressing new key markets. Meanwhile, efforts to increase energy density while minimizing cost have exposed the vulnerability of this system to catastrophic failures and explosions that are taking their toll on the industry and consumers alike. Similarly, safety and high cost are major concerns for lithium-ion (Li-ion) cells, especially at the large energy storage capacities required for grid-connected applications, and pad-mounted CES applications given their deployment in passenger vehicles or open access neighborhood sites. Wide scale deployment of Li-ion cells and other energy storage technologies is hindered due to such concerns.

Background

Seeo developed a proprietary polymer electrolyte platform that enables a new generation of rechargeable lithium batteries with unprecedented safety, lifetime, and energy density, as well as a significant materials cost advantage relative to conventional systems. Leapfrogging existing performance and cost standards, this technology represents a unique solution for addressing critical national needs for electric vehicles and large-scale renewable energy storage. More broadly, Seeo's disruptive platform promises to spark a new portable battery industry based on domestic innovation, driven by a domestic workforce, and maintained with a domestic supply chain. Seeo's cells contain no volatile or flammable components,

thus offering maximum safety. Safety testing has shown that Seeo's cell chemistry can withstand temperatures as high as 150ÂºC and voltages of 10 volts without incident. Moreover, thermal analysis has shown that Seeo's ultra-safe platform is stable for use with lithium metal anodes, even after prolonged cycling. Seeo validated its safety advantages by means of materials analysis and in small-capacity cells. The proposed demonstration will provide a venue for data collection on larger systems and across a wider range of tests and abuse conditions.

Proposed Work

Seeo proposed a comprehensive project to deliver the first ever large-scale or grid-scale prototype of a new class of advanced lithium ion rechargeable batteries, with unprecedented safety, lifetime, energy density, and cost. The primary focus of this project will be the development and deployment of a 25kWh prototype battery system based on Seeo's proprietary nanostructured polymer electrolytes. This development effort, which without the Energy Commission funding Seeo would be unable to pursue, will allow the company to validate the transformational performance advantages of its technology for use in grid-tied energy storage applications. In particular, Seeo seeks to address the utility market needs for CES systems, which envision small (<100kW) distributed energy storage systems alongside pad-mounted and pole-mounted transformers, and grid-connected electric vehicle systems.

Justification and Goals

This project "[has] the potential to enhance transmission and distribution capabilities" (Public Resources Code 25620.1.(c)(3)).

This will be accomplished by:

- Facilitating integration of intermittent renewable resources.
- Improving grid reliability and stability.
- Improving the use of existing transmission assets
- Enabling the renewable energy storage.

Exhibit A
WORK STATEMENT

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Materials Development
3		Cell Scale-Up
4		Pack Prototyping
5	X	Pack Demonstration
6		Economic and Environmental Assessment

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Mohit Singh, Seeo		
2	Hany Eitouni, Seeo		
3	Mohit Singh, Seeo		
4	Mohit Singh, Seeo		
5	Mohit Singh, Seeo		
6	Neilesh Mutyala, Seeo		Daniel Kammen, UC Berkeley

GLOSSARY

Term/ Acronym	Definition
ARRA	American Recovery and Reinvestment Act of 2009
CPR	Critical Project Review
DOE	United States Department of Energy
kg	Kilogram
kWH	Kilowatt Hours
PAC	Project Advisory Committee
PIER	Public Interest Energy Research
RD&D	Research, Development and Demonstration
WECC	Western Electricity Coordinating Council

Problem Statement:
Today's lithium ion batteries are based on an intrinsically unstable materials platform. Chemical degradation leads to premature failure in existing applications, and poor lifetimes prevent lithium ion cells from addressing new key markets. Meanwhile, efforts to increase energy density while minimizing cost have exposed the vulnerability of this system to catastrophic failures and explosions that are taking their toll on the industry and consumers alike. The Recipient has developed a proprietary polymer electrolyte

platform that enables a new generation of rechargeable lithium batteries with unprecedented safety, lifetime, and energy density, as well as a significant materials cost advantage relative to conventional systems. Leapfrogging existing performance and cost standards, this technology represents a unique solution for addressing our critical national needs for electric vehicles and large-scale renewable energy storage. More broadly, the Recipient's disruptive platform promises to spark a new portable battery industry based on domestic innovation, driven by a domestic workforce, and maintained with a domestic supply chain.

Goals of the Agreement:
The goal of this Agreement is to demonstrate the Recipient's entirely new class of lithium-based batteries that can enable the widespread deployment in Smart Grid applications through dramatic improvement in safety, stability, and energy density, along with significant reduction in cost.

This award supplements the Recipient's American Recovery and Reinvestment Act of 2009 (ARRA) award under the U.S. Department of Energy's Smart Grid Demonstrations Funding Opportunity Announcement (DE-FOA-0000036).

Objectives of the Agreement:
The objectives of this Agreement are to:

- Optimize materials to improve cell power and energy capabilities
- Scale-up materials, cell size and fabrication capacity
- Build a fully functional prototype demonstration battery pack (25 kilowatt hours (kWh)) to meet and surpass Smart Grid requirements
- Test the demonstration battery pack under simulated grid-tied conditions for a prolonged time period and gather operating data for analysis
- Perform Environmental and Economic Impact Analysis
- Elaborate a Business Plan to justify building a commercial manufacturing venture to produce and distribute the developed battery product across the United States and abroad for grid-tied energy storage applications.

Product Guidelines:
For complete product guidelines, refer to Section 5 in the Terms and Conditions.

TASK 1 ADMINISTRATION

Task 1.1 Attend Kick-off Meeting

The goal of this task is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

- Attend a "Kick-Off" meeting with the Commission Project Manager, the Grants Officer, and a representative of the Accounting Office. The Recipient shall bring its Project Manager, Agreement Administrator,

Accounting Officer, and others designated by the Commission Project Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Commission Project Manager will provide an agenda to all potential meeting participants.

The administrative portion of the meeting shall include, but not be limited to, the following:

- Discussion of the terms and conditions of the Agreement
- Discussion of Critical Project Review (Task 1.2)
- Match fund documentation (Task 1.6)
- Permit documentation (Task 1.7)

The technical portion of the meeting shall include, but not be limited to, the following:

- The Commission Project Manager's expectations for accomplishing tasks described in the Scope of Work
- An updated Schedule of Products
- Discussion of Progress Reports (Task 1.4)
- Discussion of Technical Products (Product Guidelines located in Section 5 of the Terms and Conditions)
- Discussion of the Final Report (Task 1.5)

The Commission Project Manager shall designate the date and location of this meeting.

Recipient Products:

- Updated Schedule of Products (no draft)
- Updated List of Match Funds (no draft)
- Updated List of Permits (no draft)

Commission Project Manager Product:

- Kick-Off Meeting Agenda (no draft)

Task 1.2 Critical Project Review (CPR) Meetings

The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and to identify any needed modifications to the tasks, products, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Project Manager and as shown in the Technical Task List above. However, the Commission Project Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Recipient.

Participants include the Commission Project Manager and the Recipient and may include the Commission Grants Officer, the Public Interest Energy Research (PIER) Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Project Manager to provide support to the Energy Commission.

If DOE is conducting similar meetings, the Recipient shall notify and invite the Commission project manager to participate, either by teleconference or by actual meeting attendance. The DOE required meetings can be used in place of the Commission's CPR meetings, at the discretion of the Commission Project Manager.

The Commission Project Manager shall:

- Determine the location, date, and time of each CPR meeting with the Recipient. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Recipient the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not modifications are needed to the tasks, schedule, products, and/or budget for the remainder of the Agreement. Modifications to the Agreement may require a formal amendment (please see the Terms and Conditions). If the Commission Project Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Energy Commission's Research, Development and Demonstration (RD&D) Policy Committee for its concurrence.
- Provide the Recipient with a written determination in accordance with the schedule. The written response may include a requirement for the Recipient to revise one or more product(s) that were included in the CPR.

The Recipient shall:

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects. This report shall be submitted along with any other products identified in this scope of work. The Recipient shall submit these documents to the Commission Project Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement.
- Recipient will provide copies of any DOE correspondence (emails, reports, letters, etc.) that relate to the project status. This includes copies of project

performance reviews on Recipient work and summaries and results of project review meetings with DOE.

Commission Project Manager Products:

- Agenda and a list of expected participants (no draft)
- Schedule for written determination (no draft)
- Written determination(no draft)

Recipient Product:

- CPR Report(s) (no draft)
- DOE correspondence and reporting (no draft)
- Schedule for written determination (CEC) (no draft)
- Written determination (CEC) (no draft)

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement. If DOE is conducting a similar final meeting, the Recipient shall notify and invite the Commission project manager to participate, either by teleconference or by actual meeting attendance. The DOE required meeting can be used in place of the Commission's final meeting, at the discretion of the Commission project manager. However, all items listed in this task will need to be covered in the meeting.

The Recipient shall:

- Meet with Energy Commission staff to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

  This meeting will be attended by, at a minimum, the Recipient, the Commission Grants Office Officer, and the Commission Project Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Project Manager.

  The technical portion of the meeting shall present an assessment of the degree to which project and task goals and objectives were achieved, findings, conclusions, recommended next steps (if any) for the Agreement, and recommendations for improvements. The Commission Project Manager will determine the appropriate meeting participants.

  The administrative portion of the meeting shall be a discussion with the Commission Project Manager and the Grants Officer about the following Agreement closeout items:
  - o What to do with any equipment purchased with Energy Commission funds (Options)

- Energy Commission's request for specific "generated" data (not already provided in Agreement products)
- Need to document Recipient's disclosure of "subject inventions" developed under the Agreement
- "Surviving" Agreement provisions, such as repayment provisions and confidential Products
- Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.
- Copies of all correspondence and reports discussing DOE's findings on the project, and future disposition of the project, if applicable. When directed by the Commission project manager, recipient will provide copies of any DOE correspondence (emails, reports, letters, etc.) that relate to project performance.

Products:

- Written documentation of meeting agreements (no draft)
- Schedule for completing closeout activities (no draft)
- DOE correspondence on project findings and results (no draft)

Task 1.4 Quarterly Progress Reports

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement on time and within budget.

The objectives of this task are to summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, and to form the basis for determining whether invoices are consistent with work performed.

With Commission Project Manager approval, the Recipient can submit a DOE Progress Report in lieu of the required Commission report if contains the information listed in Attachment 1 of the Terms and Conditions.

The Recipient shall:

- Prepare Quarterly Progress Reports which summarize all Agreement activities conducted by the Recipient for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Project Manager within 10 days of the end of the reporting period. The recommended specifications for each progress report are contained in Exhibit A, Attachment A-2.
- Unless otherwise directed by the Commission Project Manager, each Progress Report must contain any reports made to DOE, including

summaries of meetings with DOE, as it relates to the project outcome and performance. Include names and contacts of DOE representatives.

Product:

- Quarterly Progress Reports (no draft)
- Copies of DOE reporting and meeting summaries (no draft)

Task 1.5 Final Report

The goal of the Final Report is to assess the project's success in achieving its goals and objectives, advancing science and technology, and providing energy-related and other benefits to California.

The final report shall describe the following at a minimum: a) original purpose, approach, activities performed, results and conclusions of the work done under this Agreement; b) how the project advanced science and technology to the benefit of California's ratepayers and the barriers overcome; c) assessment of the success of the project as measured by the degree to which goals and objectives were achieved; d) how the project supported California's economic recovery in the near term and number of jobs created or sustained; e) how the project results will be used by California industry, markets and others; f) projected cost reduction impact and other benefits resulting from the project; g) discuss the project budget, including the total project cost and all the funding partners and their cost share; h) discuss how the Energy Commission funding was spent on the project, including any unique products and benefits; i) observations, conclusions and recommendations for further RD&D projects and improvements to the PIER project management process.

If a final report is required by DOE, the Recipient will include a copy of it along with the Energy Commission's final report requirements. In addition, the Recipient shall submit the draft final DOE report to the Energy Commission for review at the same time it submits it to DOE.

The Final Report shall be a public document. If the Recipient has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Recipient shall perform the following activities for both the public and confidential versions of the Final Report.

The Recipient shall:

- Provide a draft copy of the Final Report including a copy of the draft submitted to the U.S. DOE in response to the American Recovery and Reinvestment Act Funding Opportunity Notice for which an award was received. The Final Report must be completed on or before the end of the Agreement Term.

- Submit written correspondence from DOE regarding acceptance of the final report.

Products:

- Draft Final Report, including a copy of the draft report submitted to DOE
- Final Report, including a copy of the final report submitted to DOE
- Written correspondence from DOE regarding acceptance of final report (no draft)

Task 1.6 Identify and Obtain Matching Funds

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. Although the PIER budget for this task will be zero dollars, the Recipient may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds for each task during the term of this Agreement. Match funds must be identified in writing and the associated commitments obtained before the Recipient can incur any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. The letter needs to identify the following at a minimum:
  - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied.
  - Amount of each in-kind contribution, a description, documented market or book value, and its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
- Provide a copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured.
- Discuss match funds and the implications to the Agreement if they are reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide the appropriate information to the Commission Project Manager if during the course of the Agreement additional match funds are received.

- Notify the Commission Project Manager within 10 days if during the course of the Agreement existing match funds are reduced. Reduction in match funds must be approved through a formal amendment to the Agreement and may trigger an additional CPR.

Products:

- A letter regarding match funds (no draft)
- Copy(ies) of each match fund commitment letter(s) (no draft)
- Letter(s) for new match funds (if applicable) (no draft)
- Letter that match funds were reduced (if applicable) (no draft)

Task 1.7 Identify and Obtain Required Permits

The goal of this task is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track.

Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement. Although the PIER budget for this task will be zero dollars, the Recipient shall budget match funds for any expected expenditures associated with obtaining permits. Permits must be identified in writing and obtained before the Recipient can make any expenditures for which a permit is required.

The Recipient shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. If there are no permits required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
  - A list of the permits that identifies the:
    - Type of permit
    - Name, address and telephone number of the permitting jurisdictions
    - or lead agencies
  - The schedule the Recipient will follow in applying for and obtaining these permits.
- Discuss the list of permits and the schedule for obtaining them at the kick-off meeting and develop a timetable for submitting the updated list, schedule and the copies of the permits. The implications to the Agreement if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in the Progress Reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, provide the appropriate information on each permit and an updated schedule to the Commission Project Manager.

- As permits are obtained, send a copy of each approved permit to the Commission Project Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Project Manager within 10 days. Either of these events may trigger an additional CPR.

Products:

- Letter documenting the permits or stating that no permits are required (no draft)
- A copy of each approved permit (if applicable) (no draft)
- Updated list of permits as they change during the term of the Agreement (if applicable) (no draft)
- Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable) (no draft)

TECHNICAL TASKS

Task 2 Materials Development

The goal of this task is to optimize the material properties of the Recipient's proprietary polymer electrolyte, researching polymer permutations which perform across various temperature and voltage profiles. Additionally, this task will focus on process scale-up of various polymer formulations from lab-scale amounts to amounts necessary for prototype manufacturing. The objective here is to design, develop, test, and validate polymer synthesis routes for existing polymer formulations and those developed over the course of the project.

The Recipient shall:

- Prepare development plan for polymer materials
- Isolate preferred synthetic route for scaled-up polymer permutations
- Specify mechanical, voltage stability, and conductivity targets
- Develop polymer permutations that meet or exceed these targets
- Validate polymer performance via coating trials and dummy cell cycling
- Scale-up polymer in 10 kilogram (kg) batches within 10% of performance spec (mol weight, phase ration, conductivity, stability)
- Isolate polymer permutation for scale-up and pack prototyping
- Prepare a Monthly Project Status Report that summarizes activities performed within this task
- Submit the Quarterly Metrics Report required by DOE for ARRA-funded projects

Products:

- Monthly Project Status Reports (no draft)
- Quarterly Metrics Reports (no draft)

Task 3 Cell Scale-Up

The goal of this task is to the pursue the methodic approach of incrementally scaling up and validation testing of polymer synthesis, electrode coating, and cell fabrication from current lab-scale amounts to small scale formats and finally to large, full-size cells (100cms), and corresponding sub-products as required for the demonstration pack.

The Recipient shall:

- Coat and hand assemble small area electrodes into small-scale single stacks
- Prepare small scale bi-face coated cathode and hand assemble full-stack complete with electrical contacts and pouch
- Develop electrical and geometric specifications for large-area stacked cells
- Source and order capital equipment required as part of development and demonstration work
- Submit purchase orders for capital equipment to the Project Manager
- Install newly acquired laboratory equipment
- Install Dryroom extension
- Develop and document solid-state manufacturing process, including all in-line controls and pouch cell validation protocols
- Prepare a Monthly Project Status Report that summarizes activities performed within this task
- Submit the Quarterly Metrics Report required by DOE for ARRA-funded projects

Products:

- Purchase Orders for all capital equipment (no draft)
- Monthly Project Status Reports (no draft)
- Quarterly Metrics Reports (no draft)

Task 4 Pack Prototyping

The goal of this task is to design, build, and validation test a 25kWh battery pack for grid-tied demonstration and performance testing.

The Recipient shall:

- Determine resource plan (subcontractor, internal) for design, assembly and testing of battery pack
- Design mechanical, thermal and electrical architecture for prototype pack
- Prepare mechanical and electrical pack design drawings
- Fabricate and test cells required for 25kWh pack prototype

- Construct and assemble the prototype pack, including cells, interconnections, outer casing, thermal management system, and power and communication connections
- Prepare a Monthly Project Status Report that summarizes activities performed within this task
- Submit the Quarterly Metrics Report required by DOE for ARRA-funded projects

Products:

- Mechanical and Electrical Pack Design Drawings (no draft)
- Monthly Project Status Reports (no draft)
- Quarterly Metrics Reports (no draft)

Task 5 Pack Demonstration

The goal of this task is to demonstrate the performance capabilities and advantages of the Recipient's battery technology via simulated testing of a grid-tied energy storage device. Included in this task is the development of a test data plan, demonstration of test data gathering and use as a case-study for full scale impact analysis along with dissemination of findings.

The Recipient shall:

- Develop a Prototype Test Plan using utility-derived specifications/performance and safety requirements for Community Energy Storage systems
- Perform demonstration simulated testing of grid-tied energy storage application
- Collect and analyze demonstration testing data
- Disseminate demonstration performance results and baseline comparisons
- Participate in a CPR as per task 1.2
- Prepare a Monthly Project Status Report that summarizes activities performed within this task
- Submit the Quarterly Metrics Report required by DOE for ARRA-funded projects

Products:

- Prototype Test Plan (no draft)
- Monthly Project Status Reports (no draft)
- Quarterly Metrics Reports (no draft)

Task 6 Economic and Environmental Assessment

The goal of this task is to assess the environmental and economic impact of the Recipient's technology for grid-tied applications. Specifically, Professor Dan Kammen

from the University of California, Berkeley, will lead a team of graduate students to develop a template for energy storage impact analysis under different renewable energy policy and technology scenarios. Performance data from the Recipient's pack prototype will be used to compare the impact of a successful system against a set of baseline scenarios. Finally, as part of this task, a Business Plan will be developed in order to allow the Recipient's revolutionary technology as optimized and validated as part of this Agreement to be commercialized. All technical and commercial aspects related to project justification and funding requirements and backers will be addressed in this effort.

The Recipient shall:

- Create a general template for impact analysis in grid-tied energy storage applications
- Develop a set of baseline and aggressive clean energy scenarios for California, California/Washington/Oregon, and the entire Western Electricity Coordination Council (WECC) region
- Use these scenarios to examine the technical needs and incremental costs to expand clean energy generation significantly
- Examine system reliability testing of the WECC grid with and without deployed storage
- Develop a deployment pathway for an energy storage innovation program at the federal and regional level
- Prepare an Impact Analysis Report that will assess the environmental and economic impact of the Recipient's energy storage technology for grid-tied applications under different renewable energy policy and technology scenarios
- Production Readiness Business Plan, including all technical and commercial aspects required to justify and seek/obtain funding in order to launch mass-market production of battery product developed as part of this Agreement
- Prepare a Monthly Project Status Report that summarizes activities performed within this task
- Submit the Quarterly Metrics Report required by DOE for ARRA-funded projects

Products:

- Impact Analysis Report (no draft)
- Production Readiness Business Plan (no draft)

Exhibit A
Attachment A-1
Schedule of Products and Due Dates

Task Number	Task Name	Product(s)	Planned Start Date	Due Date
1.1	**Attend Kick-off Meeting**			
		Updated Schedule of Products (no draft)	11/21/2011	12/5/2011
		Updated List of Match Funds (no draft)	11/21/2011	12/5/2011
		Updated List of Permits (no draft)	11/21/2011	12/5/2011
		Kick-Off Meeting Agenda (CEC) (no draft)	11/21/2011	12/5/2011
1.2	**Critical Project Review Meetings**			
		CPR Report (no draft)	11/20/2012	1/21/2013
		DOE correspondence and reporting (no draft)	11/20/2012	1/21/2013
	1st CPR Meeting	(no draft)	11/20/2012	1/21/2013
		Schedule for written determination (CEC) (no draft)	11/20/2012	1/21/2013
		Written determination (CEC) (no draft)	11/20/2012	1/21/2013
1.3	**Final Meeting**			
		Written documentation of meeting agreements (no draft)	12/5/2013	3/25/2014
		Schedule for completing closeout activities (no draft)	12/5/2013	3/25/2014
		DOE correspondence on project findings and results (no draft)	12/5/2013	3/25/2014
1.4	**Quarterly Progress Reports**			
		Monthly Progress Reports (no draft)	Upon full execution of agreement	Progress reports to match DOE report schedule
		Copies of DOE reporting and meeting summaries (no draft)	As needed	As needed
1.5	**Final Report**			
		Draft Final Report, including a copy of the draft report submitted to DOE	10/21/2013	12/5/2013
		Final Report, including a copy of the final report submitted to DOE	12/5/2013	2/20/2014
		Written correspondence from DOE regarding acceptance of final report	N/A	N/A
1.6	**Identify and Obtain Match Funds**			
		A letter regarding match funds (no draft)	11/21/2011	12/5/2011
		Copy(ies) of each match fund commitment letter(s) (if applicable) (no draft)	11/21/2011	12/5/2011
		Letter(s) for new match funds (if applicable) (no draft)	N/A	Within 10 days of identifying new match funds
		Letter that match funds were reduced (if applicable) (no draft)	N/A	Within 10 days of identifying new match funds

Exhibit A
Attachment A-1
Schedule of Products and Due Dates

1.7	**Identify and Obtain Required Permits**		
	Letter documenting the permits or stating that no permits are required (no draft)	11/21/2011	12/5/2011
	A copy of each approved permit (if applicable) (no draft)	N/A	Within 10 days of receiving each permit
	Updated list of permits as they change during the term of the Agreement (if applicable) (no draft)	N/A	Within 10 days of change in list of permits
	Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable) (no draft)	N/A	Within 10 days of change in schedule for obtaining permits
2	**MATERIALS DEVELOPMENT**		
	Monthly Project Status Reports (no draft)	12/5/2011	6/19/2012
	Quarterly Metrics Reports (no draft)	12/5/2011	6/19/2012
3	**CELL SCALE-UP**		
	Purchase Orders for all Capital Equipment (no draft)	12/5/2011	6/19/2012
	Monthly Project Status Reports (no draft)	12/5/2011	6/19/2012
	Quarterly Metrics Reports (no draft)	12/5/2011	6/19/2012
4	**PACK PROTOTYPING**		
	Mechanical and Electric Pack Design Drawings (no draft)	1/20/2012	1/21/2013
	Monthly Project Status Reports (no draft)	1/20/2012	1/21/2013
	Quarterly Metrics Reports (no draft)	1/20/2012	1/21/2013
5	**PACK DEMONSTRATION**		
	Prototype Test Plan (no draft)	11/20/2012	1/21/2013
	Monthly Project Status Reports (no draft)	1/21/2013	1/20/2014
	Quarterly Metrics Reports (no draft)	1/21/2013	1/20/2014
6	**ECONOMIC and ENVIRONMENTAL ASSESSMENT**		
	Impact Analysis Model Documentation (no draft)	12/5/2011	1/21/2013
	Final Impact Analysis Report (no draft)	11/20/2013	1/20/2014
	Production Readiness Business Plan (no draft)	11/20/2013	1/20/2014

Exhibit B
Category Budget

Budget Category Item	PIER Cost Share	DOE Funds	Match Share
Personnel:			
Direct Labor	$ 313,512	$ 1,367,225	$ 1,310,618
Fringe Benefits	$ 286,488	$ 1,375,919	$ 1,071,142
Total Personal Services	**$ 600,000**	**$ 2,743,144**	**$ 2,381,760**
Operating Expenses:			
Travel		$ 64,679	$ 119,321
Equipment		$ 1,751,680	$ 1,638,320
Materials / Supplies		$ 714,310	$ 710,690
Contractual		$ 306,156	$ 239,717
Miscellaneous			
Total Operating Expenses	**$ -**	**$ 2,836,825**	**$ 2,708,048**
Overhead:			
Overhead		$ 616,091	$ 506,254
Total Overhead	**$ -**	**$ 616,091**	**$ 506,254**
Total	***$ 600,000***	***$ 6,196,060***	***$ 5,596,062***

**Please note: Seeo was not required by DOE to identify match dollars vrs. DOE requested funds into different bu
and tasks. The final contract signed by the DOE with Seeo states that DOE will reimburse 50% of the costs incurred,
$6.2M. Therefore, the dollar amounts provided in the ARRA and match dollar worksheets are approximations only
Actual breakdown of ARRA funds and Match dollars may be different than what is stated on the CEC budget templ

Exhibit B
Category Budget

Total Cost ($)
$ 2,991,355
$ 2,733,549
$ 5,724,904
$ 184,000
$ 3,390,000
$ 1,425,000
$ 545,873
$ -
$ 5,544,873
$ 1,122,345
$ 1,122,345
$ 12,392,122

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